

REMARKS

This is a full and timely response to the outstanding final Office action electronically delivered on March 30, 2010. Reconsideration and allowance of the application and presently pending claims 1-4, 13 and 15 are respectfully requested.

Present Status of the Application

Applicants thank the Examiner for the thorough examination of this application.

In the instant Office action, claims 1, 3, 4 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin (U.S. Pat. No.5,982,601; hereinafter “Lin”). Claims 1, 3-4, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quigley (U.S. Pat. No.5,781,388; hereinafter “Quigley”) in view of Lin. Claim 2 is rejected under 35 U.S.C 103(a) as being unpatentable over Quigley and Lin and further in view of Ker et al. (U.S. Pat. No.5,754,380; hereinafter “Ker”). Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Ker.

After carefully considering the Office Action and the cited references, Applicants have amended claims 1 and 2 to respectfully traverse all the rejections on the grounds set forth in detail below. No new matter has been entered since the amendment is fully supported by FIGs. 4, 5A, 5B and the related illustration thereof as originally filed. Applicants thereby respectfully assert that all the pending claims 1-4, 13 and 15 are placed in proper condition for allowance. Reconsideration of all the pending claims is respectfully requested.

Discussion of the claim rejections under 35 U.S.C. 102

Claims 1, 3, 4 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin.

In response thereto, Applicants have amended claims 1 and 2 to patently define the present application over the cited reference Lin. Now, Applicants hereby otherwise traverse these rejections.

Pertaining to claim 1 of the present invention, as currently amended, it recites in part as below:

“An electrostatic discharge (ESD) protection circuit, comprising:

...

a second diode, having a first input end coupled to the I/O pad and a second input end coupled to the fourth connection terminal, wherein a voltage rising rate at a node of the anti-latch-up circuit determines whether or not to trigger the SCR circuit and thereby prevent latching up of the SCR circuit during normal operation.” (*Emphasis added*)

Applicants have amended claim 1 incorporating the subject matter about the second diode in claim 2. Accordingly, Lin does not teach the feature of “a second diode, having a first input end coupled to the I/O pad and a second input end coupled to the fourth connection terminal” as set forth in the currently amended claim 1.

As well defined in the MPEP, “a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Therefore, the currently amended claim 1 and its dependent claims 3-4 and 13 are novel over Lin, such that the rejections thereto should be withdrawn accordingly.

Discussion of the claim rejection under 35 USC 103

Claims 1, 3-4, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quigley in view of Lin. Claim 2 is rejected under 35 U.S.C 103(a) as being unpatentable over Quigley and Lin and further in view of Ker. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Ker.

In response thereto, Applicants have amended claims 1 and 2 to patently define the present application over the cited references Quigley, Lin and Ker. Now, Applicants hereby otherwise traverse these rejections.

According to FIGs. 4, 5A, 5B and the related illustration of the present invention, the second diode 108 has a first connection terminal 122 coupled to the I/O pad 100 and a second connection terminal 124 coupled to the fourth connection terminal 126. That is to say, that the anti-latch-up circuit 110 is coupled to the I/O pad 100 through the second diode 108. Therefore, when the ESD event occurs on the I/O pad 100, the second diode 108 is conducted so as to trigger the SCR circuit 104 by the anti-latch-up circuit 110. On the other hands, when an internal circuit coupled to the I/O pad 100 is operated under a normal condition, the second diode 108 is turned off so as to avoid the anti-latch-up circuit 110 affecting said internal circuit. In other words, the anti-latch-up circuit 110 determines whether or not to trigger the SCR circuit 104 in

accordance with whether the second diode 108 is conducted.

In contrast, according to FIG. 1 and column 6 of Quigle, it recites in part as below:

“.... A voltage divider circuit comprising a capacitor and resistor is used to apply a voltage for enabling the SCR in an ESD event. To achieve this criteria, the SCR is designed to trigger at a voltage significantly greater than the operating voltage of the integrated circuit....”
(*Emphasis added*)

It can be known that, according to the teachings of Quigle, the voltage divider, which is composed of the capacitor 17 and resistor 18, is directly connected to the PAD. In order to avoid the voltage divider affecting the integrated circuit, the SCR is triggered when the voltage transmitted to the PAD is greater than the operation voltage of the integrated circuit. In other words, because the voltage divider is directly connected to the PAD, the voltage divider determines whether or not to trigger the SCR according to the voltage on the PAD.

Beside, according to FIG. 6 of Lin, the transient oscillator circuit 61 of Lin is also directly connected to the PAD or VDD BUS. Therefore, in the actual operation, the transient oscillator circuit 61 of Lin determines whether or not to trigger the SCR according to the voltage on the PAD or VDD BUS. Furthermore, according to FIG. 1 of Ker, the diode 60 of Ker is connected in parallel with the PTLSCR device 30, but the second diode 108 of the present invention is connected between the SCR circuit 104 and the anti-latch-up circuit 110. In other words, the connection relationship and operation between the diode 60 of Ker and the second diode 108 of the present invention are different.

From the above, the anti-latch-up circuit of the present invention is coupled to the I/O pad through the second diode, so that, in practical application, all of I/O pads can share the same anti-latch-up circuit by using respective diodes coupled to the same anti-latch-up circuit. However, Quigle, Lin and Ker fail to disclose and teach the I/O pad coupled to the anti-latch-up circuit through the second diode. Accordingly, neither Quigley nor Lin/Ker discloses the features of second diode as set forth in the currently amended claim 1. Therefore, the currently amended claim 1 is novel, non-obvious and patentable over Quigle, Lin, Ker, or any of the other cited references, taken alone or in combination, and thus should be allowed.

If an independent claim is non-obvious under 35 U.S.C. 103, then any claim depending therefrom is non-obvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). As a result, claims 2-4, 13 and 15 directly or indirectly depending upon the allowable claim 1 should be allowed as a matter of law.

CONCLUSION

For at least the foregoing reasons, it is believed that all the pending claims 1-4, 13 and 15 of the present application patently define over the prior art and are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,
J.C. PATENTS

/JIAWEI HUANG/
Jiawei Huang
Registration No. 43,330

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4 Venture, Suite 250
Irvine, CA 92618
Tel.: (949) 660-0761
Fax: (949)-660-0809
Email: jcpi@msn.com